

In re Patent Application of:
ROBERT M. HERRIN
Serial No. 10/721,962
Filing Date: 11/25/2003

In the Claims:

1. (currently amended): An apparatus comprising:

a platen operable for moving between a first position proximate and in spaced relation to a blank and a second position downstream therefrom, through a biasing of the platen being biased against the blank and for a driving of the blank downstream therefrom to the second position, the platen having a guide plate operable at a peripheral portion thereof for providing a compression surface;

a forming rail positioned downstream the first position for receiving the blank moving thereby against the forming rail for and folding portions thereof of the blank, wherein a proximal portion of the forming rail partially folds peripheral portions of the blank and a distal portion of the forming rail secures the blank into a partially formed tray, wherein the side walls of the partially formed tray are fully formed, the distal portion having a side folding rail portion opposing the guide plate for receiving the blank peripheral portions therebetween;

a first folding arm movably positioned for biasing against an extended portion of the partially formed tray for a continued folding thereof, the first folding arm positioned proximate the distal portion of the forming rail and downstream the proximal portion thereof, wherein the first folding arm is movable between a first position wherein allowing the platen to can move thereby along a path of the platen , the first folding arm movable to a second position wherein the first folding arm is within the path and generally perpendicular thereto;

a compression plate movably carried in spaced relation to the partially formed tray;

a fixed plate carried in spaced relation to the compression plate, the fixed plate having a surface thereof generally parallel to the path of the platen, the fixed plate and the compression plate forming a passage therebetween; and

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a second folding arm movable through the passage and positioned for biasing against the extended portion of the partially formed tray and for folding the extended portion through the passage, wherein the fixed plate is positioned for guiding the extended portion along the surface of the fixed plate onto a tray wall for providing a fully formed tray.

2. (original): An apparatus according to claim 1, further comprising an in-feed conveyor for conveying the blank to the first position.

3. (original): An apparatus according to claim 2, wherein the conveyor is positioned for conveying the blank in a non-vertical orientation for permitting gravity to hold a side surface of the blank against a surface of the conveyor.

4. (currently amended): An apparatus according to claim 1, further comprising an applicator carried upstream the platen for applying an adhesive to a selected portion of the blank prior to the platen contacting the blank.

5. (original): An apparatus according to claim 1, further comprising a drive mechanism operable with the platen for moving the platen between the first and second positions.

6. (original): An apparatus according to claim 1, wherein the platen comprises a rectangular peripheral portion dimensioned for folding a bottom panel of the blank into a rectangular shape.

7. (previously presented): An apparatus according to claim 6, wherein the rectangular peripheral portion of the platen includes bevelled corners cooperating with

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the guide plate proximate thereto for folding an inside corner support member of the formed tray.

8. (currently amended): An apparatus comprising:

a platen operable for moving between a first position proximate and in spaced relation to the blank and a second position downstream therefrom through a biasing of to the second position, the platen being biased against the blank and for a driving of the blank downstream therefrom to the second position;

a guide plate carried by the platen further defining a platen periphery and for providing a compression surface;

a forming rail positioned downstream the first position for receiving the blank moving thereby moving against the forming rail for and folding portions thereof the blank, wherein a proximal portion of the forming rail partially folds peripheral portions of the blank and a distal portion of the forming rail secures the blank into a partially formed tray;

a first folding arm movably positioned for biasing against an extended portion of the partially formed tray for a continued folding thereof, the first folding arm positioned proximate the distal portion of the forming rail and downstream the proximal portion thereof;

a compression plate movably carried in spaced relation to the partially formed tray;

a fixed plate carried in spaced relation to the compression plate and forming a passage therebetween;

a second folding arm movably positioned for biasing against the extended portion of the partially formed tray and for folding the extended portion through the passage, wherein the fixed plate is positioned for guiding the extended portion onto a tray wall for providing a fully formed tray.

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9. (original): An apparatus according to claim 8, wherein the compression surface comprises depressions for reducing a frictional contacting surface thereof.

10. (original): An apparatus according to claim 1, wherein the forming rail comprises:

opposing end folding rails positioned for receiving end portions of the blank and dimensioned for folding the end portions upwardly from a bottom portion thereof;

opposing edge rails operable with each of the opposing end folding rails for inwardly folding outside edge portions of the end portions of the blank; and

opposing side folding rails positioned for receiving side portions of the blank and for folding the side portions upwardly from the bottom portion thereof while capturing the outside edge portions of the end portions therebetween, wherein the blank is received at proximal ends of the forming rail, and wherein a distal end thereof secures therein a partially formed tray formed from the blank.

11. (original): An apparatus according to claim 1, further comprising a locking arm operable with the folding rail for securing the partially formed tray in the second position.

12. (previously presented): An apparatus according to claim 11, further comprising a drive device operable with each of the platen drive, the compression plate, the first folding arm, the second folding arm, and the locking arm for movement thereof.

13. (original): An apparatus according to claim 12, further comprising a controller operable with the drive devices for the timely movement thereof.

14. (original): An apparatus according to claim 1, further comprising a frame

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carried downstream the second position for receiving a fully formed tray prior to releasing the fully formed tray from the apparatus.

15. (original): An apparatus according to claim 1, wherein the blank includes a paperboard construction defined by:

a bottom panel;

first and second opposing end panels attached to opposing peripheral end portions of the bottom panel via first fold lines;

first and second opposing side panels attached to opposing peripheral side portions of the bottom panel via second fold lines;

an inside corner support member attached to opposing edges of each of the opposing end panels via a third fold line;

a top wall portion attached to opposing edges of each opposing side panel via a fifth fold line;

an outside corner support member attached to each of the top wall portions via a sixth fold line, wherein the outside corner support member includes a seventh fold line therein for forming an outside corner support via an end fold portion and a side fold portion thereof.

16. (previously presented): An apparatus according to claim 15, wherein the inside corner support member includes a fourth fold line therein for forming a bevel within the inside corner support member through a folding thereof, wherein the bevel results from a rectangular peripheral portion of the platen including bevelled corners cooperating with the guide plate proximate thereto for folding the inside corner support member of the formed tray.

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17. (previously presented): An apparatus according to claim 16, wherein the platen is dimensioned and aligned to fit proximate the first and second fold lines when contacting the bottom panel.

18. (original): An apparatus according to claim 15, wherein the forming rail folds the end panels about the first fold lines and the side panels about the second fold lines, with each inside corner support member folded about the third fold line inwardly of the opposing side panels, and wherein the partially formed tray is configured with the end and side panels positioned generally orthogonal to the bottom panel and each of the inside corner support members folded about the third fold line and in juxtaposition with the side panel portions, and wherein each of the top wall portions and outside corner support members are generally parallel to respective side panels thereof.

19. (original): An apparatus according to claim 15, wherein the first folding arm is operable for folding the top wall portion about the fifth fold line to a position generally parallel to the bottom panel, and wherein the side fold portion is partially folded about the sixth line by passing through the passage, and wherein the compression plate is moveable for biasing against each of the side fold.

20. (Withdrawn): An apparatus comprising:

a platen operable for moving between a first position proximate and in spaced relation to a blank and a second position through a biasing of the platen against the blank and a driving of the blank downstream therefrom;

a first folding arm movably positioned for biasing against an extended portion of the blank formed into a partially formed tray through a folding thereof;

a compression plate movably carried in spaced relation to the partially formed tray;

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a fixed plate carried in spaced relation to the compression plate and forming a passage therebetween, wherein the fixed plate is positioned for guiding the extended portion onto a tray wall.

21. (Withdrawn): An apparatus according to claim 20, further comprising a second folding arm movably positioned for biasing against the extended portion of the partially formed tray and for folding the extended portion through the passage.

22. (Withdrawn): An apparatus according to claim 20, further comprising a forming rail positioned downstream the first position for receiving the blank moving thereby and folding portions thereof.

23. (Withdrawn): An apparatus according to claim 22, wherein a proximal portion of the forming rail partially folds peripheral portions of the blank and a distal portion of the forming rail secures the blank into a partially formed tray;

24. (Withdrawn): An apparatus comprising:

a platen operable for moving between a first position proximate and in spaced relation to a blank and a second position through a biasing of the platen against the blank and a driving of the blank downstream therefrom; and

a forming rail positioned downstream the first position for receiving the blank moving thereby and folding portions thereof, the forming rail comprising:

opposing end folding rails positioned for receiving end portions of the blank and dimensioned for folding the end portions upwardly from a bottom portion thereof;

opposing edge rails operable with each of the opposing end folding rails for inwardly folding outside edge portions of the end portions of the blank; and

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opposing side folding rails positioned for receiving side portions of the blank and for folding the side portions upwardly from the bottom portion thereof while capturing the outside edge portions of the end portions therebetween.

25. (Withdrawn): An apparatus according to claim 24, wherein the blank is received at proximal ends of the forming rail, and wherein a distal portion of the forming rail secures the blank into a partially formed tray.

26. (Withdrawn): An apparatus comprising:

a platen operable for biasing against a blank and for driving of the blank downstream through a forming rail, the platen having a guide plate carried thereby about a platen periphery and for providing a compression surface operable with side wall portions of a tray formed from a folding of the blank.

27. (Withdrawn): An apparatus according to claim 26, wherein the compression surface comprises depressions for reducing a frictional contacting surface thereof.

28. (Withdrawn): An apparatus according to claim 26, wherein the guide plate comprises a plurality of guide plates for adjustably defining a platen peripheral compression surface.

29. (Withdrawn): A method of forming a tray from a paperboard blank, the method comprising:

providing a paperboard blank having a plurality of fold lines therein, the blank having a bottom panel, first and second opposing end panels attached to opposing peripheral end portions of the bottom panel via first fold lines, first and second opposing side panels attached to opposing peripheral side portions of the bottom panel via

second fold lines, wherein each of the opposing end panels has an inside corner support member attached to opposing edges of each of the opposing end panels via a third fold line, each of the opposing side panels having a top wall portion attached thereto via a fifth fold line, and wherein an outside corner support member is attached to the top wall portion via a sixth fold line, the outside corner support member having a seventh fold line therein for forming an outside corner support via an end fold portion and a side fold portion thereof;

conveying the blank from a loading position downstream along a conveying path to a first forming position;

applying an adhesive to a surface of the blank along each of the outside corner members and portions of the side panels proximate thereto as the blank is conveyed downstream to the first forming position;

supporting a platen proximate the first folding position in spaced relation to the blank, the platen dimensioned and aligned to fit proximate the first and second fold lines when contacting the bottom panel;

biasing the platen against the bottom wall for moving the blank from the first forming position downstream toward a second forming position through a forming path generally orthogonal to the conveying path;

advancing the platen through a forming rail positioned downstream the first forming position for folding the end panels about the first fold lines and the side panels about the second fold lines, wherein each inside corner support member is folded about the third fold line inwardly of the opposing side panels, and wherein the inside corner support member is further folded about the fourth fold line through a biasing of the bevelled corner portions therewith for forming a bevelled corner therefor;

further advancing the platen downstream and thus the blank along the forming path to the second forming position, wherein a distal portion of the forming rail secures the blank into a partially formed tray, wherein the partially formed tray is configured with

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the end and side panels positioned generally orthogonal to the bottom panel and each of the inside corner support members folded about the third fold line and in juxtaposition with the side panel portions having the adhesive thereon, and wherein each of the top wall portions and outside corner support members are generally parallel to respective side panels thereof;

retracting the platen from the second forming position upstream along the forming path to the spaced position;

positioning a compression plate in spaced relation to each of the side panels;

biasing a first folding arm against the top wall portion for folding the top wall portion about the fifth fold line to a position generally parallel to the bottom panel, wherein the side fold portion is partially folded about the sixth line by contacting the compression plate;

biasing a second folding arm against each of the end fold portions for a folding thereof about the seventh fold line into contact with the end wall;

biasing the compression plate against each of the side fold portions for forming a fully formed tray having double glued corner portions formed from the sandwiching of the side panel between the side fold portion of the outside corner support member and the inside corner support member; and

retracting the biasing for advancing the fully formed tray further downstream.

30. (Withdrawn): A method according to claim 29, further comprising forming a bevel within the inside corner support member through a folding thereof, wherein the platen includes bevelled corners, and wherein the inside corner support member includes a fourth fold line therein.

31. (Withdrawn): A method according to claim 29, further comprising locking the partially formed tray in the second forming position prior to the platen retracting.

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32. (Withdrawn): A method according to claim 31, further comprising unlocking the fully formed tray for permitting the advancing further downstream.

33. (Withdrawn): A method according to claim 29, further comprising advancing the fully formed tray downstream into a frame for a setting thereof.

34. (Withdrawn): A method of forming a tray, the method comprising:
providing a blank having portions thereof for forming a bottom panel, first and second opposing end panels, first and second opposing side panels, wherein each of the opposing end panels has an inside corner support member attached to opposing edges of each of the opposing end panels, each of the opposing side panels having a top wall portion attached thereto, and wherein an outside corner support member is attached to the top wall portion, the outside corner support member having an outside corner support and a side fold portion thereof for forming the blank into a tray having a double glued wall construction;

biasing a platen against the bottom panel for moving the blank downstream through a forming rail positioned for folding the end panels and the side panels, wherein each inside corner support member is folded inwardly of the opposing side panels,

further advancing the platen downstream and to a tray forming position, wherein a distal portion of the forming rail secures the blank into a partially formed tray, wherein the partially formed tray is configured with the end and side panels positioned generally orthogonal to the bottom panel and each of the inside corner support members are folded and in juxtaposition with the side panel portions, and wherein each of the top wall portions and outside corner support members are generally parallel to respective side panels thereof;

retracting the platen from the tray forming position upstream therefrom;

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positioning a compression plate in spaced relation to each of the side panels;
biasing a first folding arm against the top wall portion for folding the top wall portion to a position generally parallel to the bottom panel, wherein the side fold portion is partially folded by contacting the compression plate;
biasing a second folding arm against each of the end fold portions for a folding thereof into contact with the end wall; and
biasing the compression plate against each of the side fold portions for forming a fully formed tray.

35. (Withdrawn): A method according to claim 34, further comprising applying an adhesive to a surface of the blank along each of the outside corner members and portions of the side panels proximate thereto.

36. (Withdrawn): A method according to claim 35, wherein the adhesive applying is completed prior to the platen biasing.

37. (Withdrawn): A method according to claim 36, wherein the adhesive applying provides double glued corner portions formed from the sandwiching each of the side panels between each of the side fold portions of the outside corner support members and the inside corner support members.

38. (Withdrawn): A method according to claim 34, further comprising forming a bevel within the inside corner support member through a folding thereof, wherein the platen includes bevelled corners, and wherein the inside corner support member includes a fourth fold line therein.

39. (Withdrawn): A method according to claim 34, further comprising locking the

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partially formed tray in the second forming position prior to the platen retracting.

40. (Withdrawn): A method according to claim 39, further comprising unlocking the fully formed tray for permitting advancing the fully formed tray downstream.

41. (Withdrawn): A method according to claim 40, further comprising advancing the fully formed tray downstream into a frame for a setting thereof.

42. (Withdrawn): A method of forming a tray, the method comprising:

providing a blank having portions thereof for forming a bottom panel, first and second opposing end panels, first and second opposing side panels, wherein each of the opposing end panels has an inside corner support member attached to opposing edges of each of the opposing end panels, each of the opposing side panels having a top wall portion attached thereto, and wherein an outside corner support member is attached to the top wall portion, the outside corner support member having an outside corner support and a side fold portion thereof for forming the blank into a tray having a double glued wall construction;

biasing a platen against the bottom panel for moving the blank downstream through a forming rail positioned for folding the end panels and the side panels, wherein each inside corner support member is folded inwardly of the opposing side panels, further advancing the platen downstream and to a tray forming position, wherein a distal portion of the forming rail secures the blank into a partially formed tray, wherein the partially formed tray is configured with the end and side panels positioned generally orthogonal to the bottom panel and each of the inside corner support members are folded and in juxtaposition with the side panel portions, and wherein each of the top wall portions and outside corner support members are generally parallel to respective side panels thereof;

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retracting the platen from the tray forming position upstream therefrom;
positioning a compression plate in spaced relation to a fixed plate for forming a passage therebetween;
biasing a first folding arm against the top wall portion for folding the top wall portion to a position generally parallel to the bottom panel, wherein the side fold portion is partially folded by contacting the compression plate;
biasing a second folding arm against each of the end fold portions for a folding thereof while moving through the passage into contact with the end wall, wherein the fixed plate guides the end fold portions into a preselected orientation onto the end walls; and
biasing the compression plate against each of the side fold portions for forming a fully formed tray.

43. (Withdrawn): A method according to claim 42, wherein the platen includes a guide plate having a compression surface carried thereby about a platen periphery, and wherein the method comprises compressing end and side wall portions of a tray formed from a folding of the blank.

44. (Withdrawn): A method according to claim 43, wherein the compression surface comprises depressions for reducing a frictional contacting surface thereof.

45. (Withdrawn): A method according to claim 43, wherein the guide plate comprises a plurality of guide plates for adjustably defining a platen peripheral compression surface.

46. (previously presented): An apparatus comprising:
a platen operable for movement along a path therefor between a first position

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and a second position;

a forming rail positioned downstream the first position;

a first folding arm rotatable about an axis thereof, the first folding arm positioned proximate a distal portion of the forming rail and downstream a proximal portion thereof, wherein the first folding arm is movable between a position for allowing the platen to move thereby along the path to a position within the path;

a compression plate;

a fixed plate carried in spaced relation to the compression plate, the fixed plate having a surface thereof generally parallel to the path of the platen, the fixed plate and the compression plate forming a passage therebetween, wherein the compression plate is moveable toward the fixed plate; and

a second folding arm rotatable about an axis thereof for movement through the passage, the axis of the second folding arm being generally perpendicular to the axis of the first folding arm.

47. (previously presented): An apparatus according to claim 46, further comprising a guide plate having a compression surface thereon operable at a peripheral portion of the platen, wherein a portion of the forming rail opposes the guide plate.

48. (currently amended): An apparatus comprising:

a platen operable for moving along a path between a first position proximate and in spaced relation to a blank and a second position downstream therefrom, through a biasing of the platen being biased against the blank and for a driving of the blank downstream therefrom to the second position, the platen having a compression surface thereon generally parallel to the path thereof the platen;

a forming rail positioned downstream the first position for receiving the blank moving thereby and against the forming rail for folding portions thereof the blank,

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wherein a proximal portion of the forming rail partially folds peripheral portions of the blank and a distal portion of the forming rail secures the blank into a partially formed tray biased against the compression surface;

a first folding arm movably positioned for biasing against an extended portion of the partially formed tray for a continued folding thereof, the first folding arm positioned proximate the distal portion of the forming rail and downstream the proximal portion thereof;

a fixed plate carried proximate the first folding arm;

a compression plate carried in spaced relation to and movable toward the fixed plate, wherein a passage is formed therebetween; and

a second folding arm movable through the passage and positioned for biasing against the extended portion of the partially formed tray and for folding the extended portion through the passage, wherein the fixed plate is positioned for guiding the extended portion onto a tray wall for providing a fully formed tray.

49. (previously presented): An apparatus according to claim 48, wherein the first folding arm is movable between a position allowing the platen to move thereby along a path of the platen to a position within the path and generally perpendicular thereto.

50. (previously presented): An apparatus according to claim 48, wherein the fixed plate includes a surface thereon generally parallel to the path of the platen, the fixed plate and the compression plate forming a passage therebetween, and wherein the fixed plate is positioned for guiding the extended portion of the partially formed tray along the surface of the fixed plate.

51. (currently amended): An apparatus comprising:

a conveyor dimension for conveying a blank to a first position;

applicator positioned proximate the conveyor for applying an adhesive to a selected portion of the blank;

a platen operable downstream the applicator for moving between the first position proximate and in spaced relation to the blank and a second position downstream therefrom, through a biasing of the platen being biased against the blank for driving the blank downstream therefrom to the second position;

a forming rail positioned downstream the first position for receiving the blank moving thereby and against the forming rail for folding portions thereof the blank, wherein a proximal portion of the forming rail partially folds peripheral portions of the blank and a distal portion of the forming rail secures the blank into a partially formed tray;

a first folding arm movably positioned for biasing against an extended portion of the partially formed tray for a continued folding thereof, the first folding arm positioned proximate the distal portion of the forming rail and downstream the proximal portion thereof, wherein the first folding arm is movable between a first position allowing wherein the platen to can move thereby along a path of the platen, the first folding arm movable to a second position wherein the first folding arm is within the path and generally perpendicular thereto;

a compression plate movably carried in spaced relation to the partially formed tray;

a fixed plate carried in spaced relation to the compression plate, the fixed plate having a surface thereof generally parallel to the path of the platen, the fixed plate and the compression plate forming a passage therebetween; and

a second folding arm movable through the passage and positioned for biasing against the extended portion of the partially formed tray and for folding the extended portion through the passage, wherein the fixed plate is positioned for guiding the

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extended portion along the surface of the fixed plate onto a tray wall for providing a fully formed tray.

52. (previously presented): An apparatus according to Claim 51, further comprising a guide plate operable at a peripheral portion of the platen, the guide plate having a compression surface thereon, wherein the distal portion includes a side folding rail portion opposing the guide plate for receiving the blank peripheral portions therebetween.

53. (previously presented): An apparatus according to claim 52, wherein the compression surface comprises depressions for reducing a frictional contacting surface thereof.

54. (previously presented): An apparatus according to claim 52, wherein the rectangular shape includes bevelled corners thus providing an eight sided platen, wherein the bevelled corners cooperate with the guide plate proximate thereto for folding an inside corner support member of the formed tray.

55. (previously presented): An apparatus according to claim 51, wherein the conveyor is positioned for conveying the blank in a non-vertical orientation for permitting gravity to hold a side surface of the blank against a surface of the conveyor.

56. (previously presented): An apparatus according to claim 51, wherein the platen comprises a rectangular shape dimensioned for folding a bottom panel of the blank into a rectangular shape.